Poverty and Violent Crime

Is the HOPE VI project Practical?

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Urban Economics
Purpose

The purpose of this paper is to explore the role that concentration of poverty, as opposed to just poverty in general, plays in determining the violent crime rate. Using two separate measures of poverty (mean income and percentage of people living below the poverty level\(^1\)) I will create two dummy variables that serve as indicators for the heterogeneity of income in a neighborhood. Next I will attempt to use these two indicator variables to show the effects of a change in the concentration of poverty on the violent crime rate while controlling for levels of wealth and other characteristics measured at the neighborhood level. I hypothesize that contrary to what certain affordable housing projects seem to assume a decrease in the concentration of poverty (and thus an increase in the heterogeneity of income) will lead to an increase in the violent crime rate, holding all other factors constant. To help me show this I will be using a data set collected for the Project on Human Development in Chicago Neighborhoods. This is one of the most extensive data sets ever collected at the neighborhood level and consists of survey results and aggregated census bureau results from all across the Chicago area.

Introduction

Affordable housing is becoming an increasingly important issue in the United States. Approximately six hundred thousand people go homeless every night in the U.S. (Free Donation) and fourteen and a half million people are forced to turn to the

\(^1\) The U.S. Census Bureau defines poverty as a household whose income is less than its threshold. The household income is calculated by adding together earnings, unemployment compensation, social security, and a number of other measures that are listed on the U.S. Census Bureau’s site online. A family’s threshold reflects some of the families needs but is mostly just a statistical yardstick.
government for help finding housing (habitat for humanity). However, the way in which the government helps its citizens find affordable housing has changed several times over the past century. Beginning in the 1930’s the U.S. government began constructing housing projects in which low-income citizens could live for greatly reduced rents. These projects however have come to be associated with extremely high crime rates, widespread drug abuse, and an unusually high level of mental illness. In 1974 the Housing Choice Voucher Program (also known as Section 8) was signed into law. Section 8 allows for citizens who qualify for public housing to use government provided housing vouchers to go find housing on their own. These housing vouchers typically ask that recipients use up to a certain percentage of their income towards their housing bill and then cover the remainder of the cost. 1993 marked another significant shift in the government’s policy of affordable housing. The HOPE VI program, started after recommendations made by the National Commission on Severely Distressed Public Housing, prompted the government to begin providing grants for cities to destroy the old public housing projects and replace them with new mixed-income housing. The justification behind this shift in policy lies in the belief that the concentration of poverty, instead of just poverty itself, leads to negative social repercussions, one of which is an increase in violent crime (Wilson, 1987).

**HOPE VI**

Since its foundation in 1993 the HOPE VI program has provided 5.5 Billion dollars in grants to cities. And yet there is very little evidence showing that destroying the old public housing projects and replacing it with mixed-income housing helps the
citizens of the neighborhood by decreasing the violent crime rate. Zielenbach, 2003 shows that the property values increase in HOPE VI neighborhoods but this would seem to be an obvious result and not necessarily an indication that the program warrants such intense funding from the government. Clearly by destroying old and decaying housing and then building newer housing in its place property values will increase. On top of that this newer and better quality housing is only offered to a select few members of the old (and generally poor) residents and the rest is offered to wealthier renters, which will also increase property values in the neighborhood. A more interesting study would be to look at how the displacement of old residents affects property values across the city instead of just in the transformed neighborhood.

Besides the huge amount of money that the government has already spent on the HOPE VI project there are several other costs that arise from the shift from public housing projects to mixed-income housing. The first problem stems from the actual process of destroying the old public housing projects. One of the positive aspects of the public housing projects was that it made a huge number of apartments available to people looking for housing. In changing these projects into mixed-income housing one result is a decrease in the total housing stock. That is, after the transformation there are fewer housing units available to people in the city as a whole since fewer mixed income units are built to replace the units that existed in the old projects. This loss is even more extreme for people looking for low cost housing since some of the units that were low-income housing are converted into higher cost housing. The reduced stock of low income-housing then causes two things to happen: First, because the supply of low income housing decreases but the demand remains unchanged the price of these low
income units rises. Secondly, the way that HOPE VI works is that it doesn’t guarantee housing to the old residents of the housing project and therefore some of the old residents are forced to explore other housing options. More specifically it offers the residents of the old public housing projects four options:

1. They can pass a screening for a limited number of public housing units in the new mixed-income housing development.
2. They can use a housing choice (Section 8) voucher to move into the private market (Generally forces people to pay up to 40% of their income on their rent and then covers the rest.).
3. They can move into a different public housing unit if one is available.
4. They can leave assisted housing.

Since public housing units in the new development are only available in a limited quantity most of the residents are forced to explore one of the other four options. The problem with the second option is that people who try to use Section 8 vouchers are often discriminated against by landlords (Some landlords refuse to accept tenants who are using Section 8 vouchers) and therefore they also have trouble finding places to live. Because of the HOPE VI program many old housing projects have already been converted into mixed-income housing and so the third option is also available to only a few of the displaced tenants. Thus many of the tenants of the former public housing projects are forced out of assisted housing and into the private market.

All these problems aside the question that this paper will explore is whether, as is claimed by advocates of the HOPE VI program, changing the old public housing projects into mixed-income housing and therefore reducing the concentration of poverty in a neighborhood will reduce the violent crime rate in that neighborhood. There is some previous literature that uses the same data set looks at how violent crime changes across neighborhoods in Chicago. In this paper Sampson et al. (Sampson, 1997) conclude that social networks in neighborhoods lead to positive social repercussions such as a lower crime rate. The paper argues that these social networks are oftentimes much stronger in
neighborhoods that have a homogeneous composition, both in terms of ethnicity and income. Considering this analysis I therefore predict that an increase in the concentration of poverty (also a decrease in the heterogeneity of income) will lead to a decrease in the violent crime rate holding other factors constant.

Data

The data I used for this paper was collected for the Project on Human Development in Chicago Neighborhoods (PHDCN). 343 neighborhood clusters (NCs) were created for this project by combining the 847 census tracts that exist in the city of Chicago. The neighborhood clusters were formed giving consideration to geographical boundaries (railroad tracks, parks, freeways), existing neighborhood communities, and size (each of the neighborhood clusters has a population around 8000).

The data includes responses to surveys conducted in the neighborhood clusters as well as census data aggregated to fit the neighborhood clusters. The aggregated census data contains variables that measure the socioeconomic status (SES) of residents and the race composition of the NCs. The table below contains a list of all the variables I used and their labels.

<table>
<thead>
<tr>
<th>variable label</th>
<th>variable name</th>
</tr>
</thead>
<tbody>
<tr>
<td>nc_num</td>
<td>neighborhood cluster</td>
</tr>
<tr>
<td>ctotpop</td>
<td>total population, 90 census</td>
</tr>
<tr>
<td>cblack</td>
<td>% black, 90 census</td>
</tr>
<tr>
<td>cwhite</td>
<td>% white, 90 census</td>
</tr>
<tr>
<td>chispan</td>
<td>% hispanic, 90 census</td>
</tr>
<tr>
<td>cunemp</td>
<td>% unemployment, 90 census</td>
</tr>
<tr>
<td>college</td>
<td>% college, 90 census</td>
</tr>
<tr>
<td>cpubas</td>
<td>% public assistance, 90 census</td>
</tr>
<tr>
<td>c pov90</td>
<td>% poverty, 90 census</td>
</tr>
<tr>
<td>cmhhinc</td>
<td>mean hh income, 90 census</td>
</tr>
<tr>
<td>cdensity</td>
<td>persons per sq mile, 90 census</td>
</tr>
<tr>
<td>lviolr95</td>
<td>log total violent crime rate per 100,000, 1995</td>
</tr>
<tr>
<td>linc</td>
<td>log mean hh income, 90 census</td>
</tr>
<tr>
<td>het1</td>
<td>dummy variable=1 if c pov&gt;=15 &amp; cm hhinc&gt;26000, 0 if not</td>
</tr>
<tr>
<td>het2</td>
<td>dummy variable=1 if c pov&lt;15 &amp; cm hhinc&lt;37000, 0 if not</td>
</tr>
</tbody>
</table>
For this study lvior95 will be the dependent variable all the other variables listed above will be the independent variables. Violent crime is defined by the U.S. Department of Justice to include murder, rape and sexual assault, robbery, and sexual assault. Because the log of violent crime is included instead of just violent crime the analysis that I do will be in terms of a percentage increase in violent crime as opposed to an absolute increase in violent crime. Since I’m trying to focus on the effect that concentration of poverty has on violent crime the variables that are unrelated to income will merely serve as controls in the regression. I’ve included them in my model for the purpose of isolating the effect of the income related variables on the violent crime rate (having the non-income related variables in the model will allow me to hold them all constant while varying the desired variable). Unfortunately I wasn’t able to gain access to a variable that is an exact measure of how heterogeneous with respect to income a neighborhood is (or how concentrated poverty is). Instead I was forced to create new variables, using the information that I had, to serve in place of an exact measure of income heterogeneity. The variables het1 and het2 are the two dummy variables that I created to show how heterogeneous with respect to income a neighborhood is. I constructed these variables by using the median percentage of people below the poverty level (15) and the upper and lower quartiles for mean income (25%= 26000 and 75%=37000) across the sample.

<table>
<thead>
<tr>
<th>% of people living in poverty (below median)</th>
<th>Mean Income above 3rd Quartile</th>
<th>Mean Income below 1st Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of people living in poverty (above median)</td>
<td>A</td>
<td>B (Het1)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>D(Het2)</td>
</tr>
</tbody>
</table>
Using these measures I say an NC is heterogeneous in terms of income if it has a mean income below $26000 and fewer than 15% of its residents live below the poverty level or a mean income above $37000 and more than 15% of its residents live below the poverty level. So from the table at the bottom of page 6 groups C and B are NCs that I define to be heterogeneous with respect to income (to have low concentration of poverty). Including het1 and het2 in the model will allow me to determine the effect of concentration of poverty (or lack of concentration of poverty) on lviolr95 (the log of the violent crime rate in 1995) while controlling for the more general measures of poverty (cmhhinc and cpov90). Finally I’ve used log(cmhhinc) as opposed to cmhhinc because the coefficient on log(cmhhinc) has a more tangible economic meaning than the coefficient on cmhhinc would, it is the income elasticity of violent crime in the neighborhoods. Table 2 presents some basic statistics for the variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>nc_num</td>
<td>343</td>
<td>185.22</td>
<td>105.86</td>
<td>1</td>
<td>364</td>
</tr>
<tr>
<td>ctotpop</td>
<td>343</td>
<td>8115.33</td>
<td>2873.74</td>
<td>2293</td>
<td>25178</td>
</tr>
<tr>
<td>cblack</td>
<td>343</td>
<td>41.09</td>
<td>43.65</td>
<td>0</td>
<td>99.81</td>
</tr>
<tr>
<td>cwhite</td>
<td>343</td>
<td>35.26</td>
<td>34.71</td>
<td>0</td>
<td>97.29</td>
</tr>
<tr>
<td>chispan</td>
<td>343</td>
<td>19.83</td>
<td>25.82</td>
<td>0</td>
<td>96.26</td>
</tr>
<tr>
<td>cunemp</td>
<td>343</td>
<td>13.85</td>
<td>9.51</td>
<td>1.9</td>
<td>59.06</td>
</tr>
<tr>
<td>college</td>
<td>343</td>
<td>19.99</td>
<td>15.51</td>
<td>2.24</td>
<td>80.73</td>
</tr>
<tr>
<td>cpubas</td>
<td>343</td>
<td>17.48</td>
<td>15.06</td>
<td>1.02</td>
<td>77.26</td>
</tr>
<tr>
<td>cpov90</td>
<td>343</td>
<td>20.43</td>
<td>17.31</td>
<td>.23</td>
<td>88.18</td>
</tr>
<tr>
<td>cmhhinc</td>
<td>343</td>
<td>32359.95</td>
<td>9527.82</td>
<td>8289</td>
<td>77564.5</td>
</tr>
<tr>
<td>cdensity</td>
<td>343</td>
<td>7009.11</td>
<td>4110.43</td>
<td>226.86</td>
<td>30192.43</td>
</tr>
<tr>
<td>lviolr95</td>
<td>343</td>
<td>8.78</td>
<td>.79</td>
<td>6.16</td>
<td>10.58113</td>
</tr>
<tr>
<td>linc</td>
<td>343</td>
<td>10.34</td>
<td>.28</td>
<td>9.10</td>
<td>11.26</td>
</tr>
<tr>
<td>het1</td>
<td>343</td>
<td>.27</td>
<td>.45</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>het2</td>
<td>343</td>
<td>.42</td>
<td>.42</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Regression Model**

To help me analyze the data I decided to use the Ordinary Least Squares (OLS) model. In using OLS I made the following assumptions:

1. Independent Random Sampling
2. The true relationship between the variables can be expressed linearly
3. \( E[\varepsilon/X] = 0 \) (There are no variables not included in the model that affect the dependent variable)
4. No perfect co linearity between the independent variables
5. Homoscedastic standard errors (The standard errors aren’t dependent on the independent variables)

Making these assumptions allows me to make statements about the causal (ceteris paribus) relationship between the independent and dependent variables. The coefficients produced by the regression can now be analyzed as the effect on \( \text{violr95} \) of changing each of the independent variables. For example the coefficient on \( \text{lin} \) is the income elasticity of violent crime, that is the predicted percentage increase in violent crime with a one percent increase in mean household income. Assuming that the relationship between the independent and dependent variables is linear the model will take on the following form:

\[
y = \beta^0 + \beta^1 x^1 + \ldots + \beta^n x^n + \varepsilon
\]

\( y \) in this case is the dependent variable, \( \text{violr95} \), \( \beta^0 \) is the intercept as calculated by the OLS regression, and the \( \beta^n \) terms are the predicted coefficients on the independent variables (unemployment, mean household income, etc…) that I included in the regression. The \( \varepsilon \) term is an error term that represents all the variables that aren’t included in my model. An example of what might belong in the error term is a variable such as a measure of police presence in the NC.

I ran several regressions using the data, starting with the simple regression of \( \text{violr95} \) on \( \text{cpov90} \), then adding one independent variable at a time so I could see how the inclusion of each independent variable affected the coefficients on the other independent variables. The last two independent variables I added to the regression were \( \text{het1} \) and \( \text{het2} \) my measures of how heterogeneous in terms of income an NC is. In between
cpov90 and the het variables I decided to include three variables that together describe the racial makeup of the NC (percent white, percent black, and percent Hispanic), a population variable, the percentage of residents who are unemployed, the percentage of residents who attended college, the percentage of residents receiving some sort of public assistance, and a measure of the population density of the NC, the number of people living per square mile.

## Results

I ran the OLS regression and got the results that are displayed in table 3 below.

<table>
<thead>
<tr>
<th>Number of obs</th>
<th>342</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.8151</td>
</tr>
</tbody>
</table>

| lviolr95   | Coef.   | Std. Err. | t     | P>|t| | [95% Conf. Interval] |
|------------|---------|-----------|-------|------|---------------------|
| cpov90     | 0.009684| 0.0043397 | 2.23  | 0.026 | 0.001147 - 0.0182211 |
| lin         | -0.5297985| 0.1607051 | -3.30 | 0.001 | -0.8459376 - 0.2136594 |
| ctotpop     | 1.41e-06| 7.39e-06  | 0.19  | 0.849 | -0.0000131 - 0.000016 |
| cblack      | 0.0129215| 0.0029596 | 4.37  | 0.000 | 0.0070993 - 0.0187436 |
| cwhite      | 0.0029395| 0.0031278 | 0.94  | 0.348 | -0.0032134 - 0.0009025 |
| chispan     | 0.0087066| 0.0029207 | 2.98  | 0.003 | 0.002961 - 0.0144522 |
| cunemp      | -0.0069341| 0.007249 | -0.96 | 0.339 | -0.0211943 - 0.0073261 |
| college     | 0.0021324| 0.0020499 | 1.04  | 0.299 | -0.0019002 - 0.0061651 |
| cpubas      | 0.0123003| 0.0053986 | 2.28  | 0.023 | 0.0016802 - 0.0229204 |
| cdensity    | -1.80e-06| 5.73e-06  | -0.31 | 0.754 | -0.0000131 - 9.47e-06 |
| het1        | 0.2138073| 0.0516074 | 4.14  | 0.000 | 0.1122851 - 0.3153294 |
| het2        | 0.1821352| 0.0540441 | 3.37  | 0.001 | 0.0758196 - 0.2884507 |
| _cons       | 12.98735| 1.662708  | 7.81  | 0.000 | 9.716466 - 16.25823 |

First of all we can see that there were 342 observations in the sample. The regression yielded an R-squared value of .8084 implying that variation in the independent variables explains 80.84% of the variation in violr95. The table also displays the coefficients for all of the independent variables as well as their standard errors. The t column calculates the t-statistic for each of the independent variables. The t-statistic is a random variable that is used to test whether a coefficient is equal to zero or not. At the
95% significance level a t-statistic with an absolute value greater than 1.96 means that if I were to draw another random sample from the same set of data that coefficient would be different from zero 95% of the time.

We can see that in this model there are seven statistically significant coefficients for the variables cpov90, linc, cblack, chispan, cpubas, het1, and het2. The coefficient on linc, interpreted as the income elasticity of violent crime in a neighborhood is -.5297 which indicates that a one percent increase in the mean household income is predicted to decrease the violent crime rate by .5297%, which is an economically important coefficient as well. But trying to isolate the effect of concentration of poverty on the violent crime rate we need to examine the coefficients on the variables het1 and het2. Het1 and het2 are the dummy variables that serve as a measure of how heterogeneous in terms of income an NC is. When het1 and het2 are equal to one it implies that the NC fits our definition of being heterogeneous in terms of income and therefore controlling for mean household income and percentage of people living below the poverty level implies that concentration of poverty is low. The coefficients on both het1 and het2 are statistically significant. For het1 the coefficient is .2138 with a standard error of .0043 and a t-statistic of 4.14. This implies that the estimated percent change in the violent crime rate when changing from a neighborhood that is homogeneous to one that is heterogeneous of type het1 is an increase of 21.38%. This is a huge effect and it also implies that a lack of concentration of poverty or large variance of income increases the violent crime rate. The coefficient on het2 is .1821 with a standard error of .0540 and a t-statistic of 3.37. Therefore the estimated percent change in the violent crime rate when changing from a homogeneous neighborhood to a heterogeneous neighborhood of type
het2 is an increase of 18.21%, also a very large effect. Thus the idea that concentration of poverty increases the violent crime rate (and part of the rationale behind the HOPE VI project) is proven to be untrue by a regression using the data from this sample.

**Conclusion**

Through regression analysis of the data from the Project on Human Development in Chicago Neighborhoods I’ve shown that neighborhood clusters that have a lower concentration of poverty (and thus a higher variance of income), holding mean household income and percentage of people below the poverty level constant, is predicted to have a higher violent crime rate. This contradicts the ideas presented in the paper by William Wilson (Wilson, 1987) that claim concentration of poverty leads to an increase in various types of negative social behavior including the crime rate. One possible explanation for this is that if a neighborhood consists of some extremely poor and some wealthier people, being confronted by this difference at such an immediate level might induce the poorer people to resort to violent crimes to try and bridge this gap. This data also challenges the whole idea of the HOPE VI project by calling into question the rationale behind the program. Based on this analysis I would make the recommendation that the government stop rewarding HOPE VI grants because the evidence doesn’t support the huge amount of money that the government is spending on this program.

**Further Analysis**

There is a good deal of room for more research to be done on this topic. Firstly with a better measure of variance of incomes in the neighborhood clusters the relationship between concentration of poverty and violent crime might be painted even more clearly. While I do think that the variables I created to test this relationship did a
good job substituting for income variance in the neighborhood clusters a more exact measure of the variance would allow for a regression to show the relationship without using dummy variables. Another way in which the data could be advanced is by including a measure of police coverage in the neighborhood cluster in the model. However being able to control for police coverage in the area would likely only heighten the effects that this regression shows. Likely the neighborhoods with a higher variance of income are generally better covered by the police, so assuming that police coverage reduces crime rates, controlling for police coverage would only increase the coefficients on the het variables. Also because so many residents are displaced by the transformation to mixed income housing it would be interesting to run a regression using a neighborhood that is transformed from a public housing project to a mixed-income neighborhood and to follow the actual residents of the old neighborhood rather than the neighborhood itself. I believe any of these three options for further research could help the U.S. government very much in choosing an effective policy of affordable housing. Up to this point there hasn’t been very much research to evaluate potential government policy towards affordable housing and perhaps this is why the government has yet to come up with a successful policy. There is still a lot of room for research that explores different ways to make housing affordable to residents of this country. This research becomes more and more important with each new failed policy and the immense amount of money invested in every failed idea. Hopefully with more research the United States government will be able to provide affordable housing in an efficient and practical manner to all of the fourteen and a half million residents in search of housing aid.
Works Cited


Zielenbach, Sean. “Catalyzing Community Development: HOPE VI and Neighborhood Revitalization.” Journal of Affordable Housing. Volume 13, Number 2 (Fall 2003)

